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WALL & TONG, LLP/
ALCATEL-LUCENT USA INC.
595 SHREWSBURY AVENUE
SHREWSBURY, NJ 07702

EXAMINER	
ISOM, JOHN W	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/661,747	KOROTKY, STEVEN K.	
	Examiner	**Art Unit**	
	John Isom	2447	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10 July 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-38* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-38* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *06/10/2009*.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

1. In the amendment received 07/10/2009 (the “amendment”), Applicant has amended claims 1, 2, 28 and 36-38.

Claims 1-38 are pending.

Response to Arguments

2. In the amendment, arguments of Applicant, with respect to objections to the specification as failing to provide proper antecedent basis for the claimed subject matter, have been fully considered but are not persuasive.

Applicant requests that the examiner withdraw the objection to the specification as failing to provide proper antecedent basis for the “computer-readable medium” in claim 36, because the term "computer-readable medium" is not indefinite, because its meaning is discernible. In response, the examiner offers the following: Claim 36 is not rejected as indefinite. The specification is objected to as failing to provide proper antecedent basis for the “computer-readable medium” in claim 36. Accordingly, the instant objections are continued, *infra*.

3. In the amendment, arguments of Applicant, with respect to objections to claims, have been fully considered but are not persuasive.

Applicant states that “[r]egarding the numerous objections to the claims for lack of antecedent basis (e.g., 'a, an' or 'the,' the Examiner's attention is directed to MPEP §2173.05(e), which states: ‘the failure to provide explicit antecedent basis for terms

does not always render a claim indefinite. If the scope of a claim would be reasonably ascertainable by those skilled in the art, then the claim is not indefinite" (page 14, last ¶). In response, the examiner offers the following: The claims at issue are not rejected as indefinite. The claims at issue are objected to because the respective terms at issue lack antecedent basis in the claims. Accordingly, the instant objections are continued, *infra*.

Applicant argues that requested correction of claim 8 is unjustified because claim 7 recites "a number of demands," which provides antecedent basis for claim 8 (page 14, last ¶). In response, the examiner traverses, because claim 8 does not depend from claim 7. Accordingly, the instant objection is continued, *infra*.

Applicant states that "[t]he Examiner further asserts that the mathematical symbols within an equation are undefined. This represents clear error on the part of the Examiner. Withdrawal of these objections is respectfully requested" (page 15, 1st ¶). In response, the examiner offers the following: Because Applicant has offered no evidence or argument to support Applicant's conclusion that "[t]his represents clear error on the part of the Examiner", the examiner summarily denies the conclusion, and continues the instant objections, *infra*.

4. Applicant's arguments in the amendment, with respect to the rejection of claims 1-35 under 35 U.S.C. 101, have been fully considered but they are not persuasive.

In the amendment, Applicant argues that claims 1-35 and 38 are statutory because the limitations of claim 1, including the new limitation of "providing results for

network evaluation, design and element feature requirements”, can only be perfomed by a machine and transform the design of the network (page 15, 3rd ¶).

In response, the examiner respectfully traverses, and offers the following evidence and argument in support of the traversal:

Claims 1-35 are not statutory because the limitations of claim 1, including the new limitation of “providing results for network evaluation, design and element feature requirements”, can be performed mentally or verbally without a machine, and the design of a network is not subject matter such as an article or material. This conclusion is supported as follows.

Applicant’s specification states that “the process steps described herein are intended to be broadly interpreted as being equivalently performed **manually by a user or** by software, hardware, or a combination thereof” (page 53, lines 3-6). Thus, the limitations of claim 1, including the new limitation of “providing results for network evaluation, design and element feature requirements”, can be performed mentally or verbally without a machine. Furthermore, because the *design* of a network can be an abstract idea, the design of a network is not subject matter such as an article or material.

Based on the foregoing arguments, the examiner concludes that claims 1-35 are not statutory. Therefore, the instant rejection is continued, *infra*.

5. Applicant's arguments in the amendment, with respect to the rejection of claim 38 under 35 U.S.C. 101, have been fully considered.

In the Office action mailed 04/02/2009, claim 38 was rejected under 35 U.S.C. 101 as being directed to non-statutory subject matter. The claim, drawn to a computer program product comprising software, lacked the necessary physical articles or objects to constitute a machine or a manufacture within the meaning of 35 U.S.C. 101; did not positively comprise a series of steps or acts to be a process; and was not a combination of chemical compounds to be a composition of matter. As such, the claim failed to fall within a statutory category. It was, at best, functional descriptive material *per se*. Therefore, the claim was not statutory.

Applicant argues that "[c]laim 38 is amended to recite: 'The software [*sic*] program product stored on a computer readable medium' which renders the claim patentable under 35 U.S.C. § 101" (page 15, 3rd ¶).

The instant rejection is withdrawn. However, the examiner enters a statement with regard to construction of claim 38, *infra*.

6. Applicant's arguments in the amendment, with respect to the rejection of claim(s) 1-3, 5-11, 14-20, 22-27 and 29-35 under 35 U.S.C. 102(b) as being anticipated by Baroni et al. ("Wavelength Requirements in Arbitrarily Connected Wavelength-Routed Optical Networks", Journal of Lightwave Technology, vol. 15, No. 2, February 1997, pp. 242–251) (or "Baroni"), have been fully considered but they are not persuasive.

In the amendment, Applicant argues that claims 1-3, 5-11, 14-20, 22-27 and 29-35 are allowable over Baroni, because Baroni fails to disclose each and every element of claim 1, including "assessing and designing element feature requirements, product definition, application domains and product and technology road-mapping".

In response, the examiner respectfully traverses, and offers the following evidence and argument in support of the traversal:

Claims 1-3, 5-11, 14-20, 22-27 and 29-35 are not allowable over Baroni because

(A) Baroni teaches all of the limitations of claim 1, including the new limitation of "providing results for network evaluation, design and element feature requirements";

(B) the issue of whether Baroni discloses the quoted language, is moot; and

(C) the language in the preamble of claim 1 is not given patentable weight, and Baroni discloses the subject matter of that language.

Each of these arguments is addressed individually under a corresponding header as follows.

<u>(A) Baroni teaches all of the limitations of claim 1, including the new limitation of "providing results for network evaluation, design and element feature requirements"</u>

Baroni discloses a Table I containing topological parameters and obtained results for several network topologies (page 245; page 244, 1st ¶ under "*A. Real Networks*"). Baroni further discloses equations for calculating an average nodal degree of a network (equation 4), a maximum nodal degree using average nodal degree (equation 5), and a

minimum number of wavelengths using average internodal distance and the equivalent of equation 4 for average nodal degree (equation 9). These equations represent a heuristic algorithm for evaluating bounds on the number of wavelengths necessary to satisfy a uniform logical connectivity (the ¶ spanning pages 250 and 251).

In this disclosure of Baroni, the *average nodal degree* and *average internodal distance* teach "network-wide expectation values for mean quantities of the required network variables". The *equations 4, 5 and 9* teach "closed-form mathematical expressions for network-wide expectation values". The *maximum nodal degree* and *minimum number of wavelengths* teach "required network variables". In Table I, the *values* of maximum nodal degree and of minimum number of wavelengths, teach "quantities of required network variables". The disclosure of *obtained results* teaches "determining quantities of required network variables". The disclosure of *evaluating bounds on the number of wavelengths necessary to satisfy a uniform logical connectivity*, teaches "providing results for network evaluation, design and element feature requirements".

Thus, Baroni teaches all of the limitations of claim 1, including the new limitation of "providing results for network evaluation, design and element feature requirements".

<u>(B) The issue of whether Baroni discloses the quoted language, is moot</u>

Because "assessing and designing element feature requirements, product definition, application domains and product and technology road-mapping" is not a

limitation of claim 1, the issue of whether Baroni discloses the quoted language, is moot.

<u>(C) The language in the preamble of claim 1 is not given patentable weight, and Baroni discloses the subject matter of that language</u>

The recitation "for quantifying the needs and costs of a network using a global expectation model" has not been given patentable weight because the recitation occurs in the preamble. A preamble is generally not accorded any patentable weight where it merely recites the purpose of a process or the intended use of a structure, and where the body of the claim does not depend on the preamble for completeness but, instead, the process steps or structural limitations are able to stand alone. See *In re Hirao*, 535 F.2d 67, 190 USPQ 15 (CCPA 1976) and *Kropa v. Robie*, 187 F.2d 150, 152, 88 USPQ 478, 481 (CCPA 1951). In this case, the body of the claim does not depend on the preamble for completeness but, instead, the process steps are able to stand alone. Furthermore, the language "for quantifying the needs and costs of a network using a global expectation model" merely recites the purpose of the recited process. Thus, the language in the preamble of claim 1 is not given patentable weight.

Nonetheless, Baroni does disclose the subject matter of the language at issue. Specifically, Baroni discloses determining a theoretical lower limit on a number of wavelengths for a whole network (the ¶ spanning pages 243 and 244). This disclosure, combined with the disclosure presented in (A), *supra*, supports the conclusion that Baroni discloses the subject matter of the language at issue.

Conclusion

Because—

(A) Baroni teaches all of the limitations of claim 1, including the new limitation of "providing results for network evaluation, design and element feature requirements";

(B) the issue of whether Baroni discloses the quoted language, is moot; and

(C) the language in the preamble of claim 1 is not given patentable weight, and Baroni discloses the subject matter of that language

—the examiner concludes that claims 1-3, 5-11, 14-20, 22-27 and 29-35 are not allowable over Baroni. Accordingly, the instant rejection is continued, *infra*.

7. Applicant's arguments in the amendment, with respect to the rejection of claim(s) 36-38 under 35 U.S.C. 102(b) as being anticipated by Kirby et al. (US Pub. No. 20020120768) (or "Kirby"), have been considered but are moot in view of the new ground(s) of rejection.

Specification

8. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required:

- The specification fails to provide antecedent basis for the limitation "$\langle\kappa\rangle \cong 4\langle h\rangle/L$" in the 4th line of claim 28.

- The specification fails to provide antecedent basis for the limitation “a ratio of cost of transmission and bandwidth management” in claim 33.
- The specification fails to provide antecedent basis for “a computer-readable medium” in claim 36.

Claim Objections

9. Claims 1-4, 8, 9, 13, 15, 20, 21, 27-29 and 36-38 are objected to because of the following informalities:

- In the 1st line of claim 1, “quantifying the needs” should be “quantifying ~~the~~ needs”.
- In the 3rd line of claim 1, the limitation “required” is indefinite.
- In the 2nd line of claim 2, the limitation “minimum” is indefinite.
- In the 1st line of claim 3, “the variance of the number” should be “~~the~~ a variance of ~~the~~ a number”.
- In the 3rd line of claim 3, the symbol “σ^2” is undefined in the claim.
- In the 3rd and 5th lines of claim 3, the symbol “(W^0)” is undefined in the claim.
- In the 4th and 5th lines of claim 3, the symbol “σ” is undefined in the claim.
- In the 4th line of claim 3, the symbol “($W_{B/E}$)” is undefined in the claim.
- In the 4th line of claim 3, the symbol “$\langle W_{B/E} \rangle$” is undefined in the claim.
- In the 4th line of claim 3, the symbol “$\langle \delta \rangle_n$” is undefined in the claim.
- In the 4th line of claim 3, the symbol “$\langle 1/\delta \rangle_n$” is undefined in the claim.
- In the 4th line of claim 3, “;” should be “; and”.

- In the 5th line of claim 3, the symbol "σ_d" is undefined in the claim.
- In the 5th line of claim 3, the symbol "(d)" is undefined in the claim.
- In the 6th line of claim 3, "the expectation value of the" should be "~~the~~ an expectation value of ~~the~~ a".
- In the 7th line of claim 3, "the expectation value of the" should be "~~the~~ an expectation value of ~~the~~ a".
- In the 8th line of claim 3, "the average" should be "~~the~~ an average".
- In the 8th line of claim 3, "the mean" should be "~~the~~ a mean".
- In the 1st line of claim 4, "the ratio" should be "~~the~~ a ratio".
- In the 3rd line of claim 4, the symbol "$\langle \rho' \rangle$" is undefined in the claim.
- In the 2nd line of claim 8, "the number" should be "~~the~~ a number".
- In the 3rd line of claim 9, the symbol "$\langle W^0 \rangle$" is undefined in the claim.
- In the 4th line of claim 9, "the expectation value of the" should be "~~the~~ an expectation value of ~~the~~ a".
- In the 5th line of claim 9, "the average" should be "~~the~~ an average".
- In the 5th line of claim 9, "the mean" should be "~~the~~ a mean".
- In the 3rd line of claim 13, the symbol "$\langle h \rangle$" is undefined in the claim.
- In the 4th and 5th lines of claim 13, "the average" should be "~~the~~ an average".
- In the 2nd line of claim 15, "the number" should be "~~the~~ a number".
- In the 2nd line of claim 20, "the number" should be "~~the~~ a number".
- In the 3rd line of claim 21, the symbol "$\langle P^\kappa \rangle$" is undefined in the claim.

- In the 4th line of claim 21, “the expectation value of the” should be “~~the~~ an expectation value of ~~the~~ a”.
- In the 5th line of claim 21, “the extra” should be “~~the~~ an extra”.
- In the 5th line of claim 21, “the average” should be “~~the~~ an average”.
- In the 6th line of claim 21, “the mean” should be “~~the~~ a mean”.
- In the 2nd line of claim 27, “the number” should be “~~the~~ a number”.
- In the 3rd and 4th lines of claim 28, the symbol “$\langle\kappa\rangle$” is undefined in the claim.
- In the 5th line of claim 28, “the average” should be “~~the~~ an average”.
- In the 6th line of claim 28, “the mean” should be “~~the~~ a mean”.
- In the 2nd line of claim 29, “the extra” should be “~~the~~ an extra”.
- In claim 36, the language following the recitation “[a] computer-readable medium” is not limiting, because the set of instructions is not positively recited as being stored on the computer-readable medium.
- In the 3rd line of claim 36, the limitation “required” is indefinite.
- Claim 37 does not further limit claim 36 from which it depends, because the method recited in claim 36 is not limiting of claim 36.
- In the 3rd line of claim 37, the limitation “minimum” is indefinite.
- In the 2nd line of claim 38, please amend as follows: “quantifying [[the]] needs”.
- In the 3rd line of claim 38, please amend as follows: “the steps of:”.
- In the 4th line of claim 38, the limitation “required” is indefinite.

Appropriate correction is required.

Claim Construction - 35 USC § 101

10. Claim 38 is directed to "[a] computer program product stored on a computer-readable medium . . . ." Claim 36 is directed to "[a] computer-readable medium . . . ." In the amendment, Applicant admits that "[i]n this case 'computer readable medium' [] is not defined or used in the specification" (page 14, 1st ¶). In the instant Application, the examiner construes "computer-readable medium" to exclude transmission type media.

Claim Rejections - 35 USC § 102

11. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

12. Claims **1-3, 5-11, 14-20, 22-27 and 29-35** are rejected under 35 U.S.C. 102(b) as being anticipated by **Baroni et al.** ("Wavelength Requirements in Arbitrarily Connected Wavelength-Routed Optical Networks", *Journal of Lightwave Technology*, vol. 15, No. 2, February 1997, pp. 242–251) (or "Baroni").

With regard to claim **1**, Baroni teaches: A method for quantifying the needs and costs of a network using a global expectation model, comprising:

determining quantities of required network variables using closed-form mathematical expressions for network-wide expectation values for mean quantities of

the required network variables (page 245, Table I and equations 4 and 5; page 244, 1st ¶ under "*A. Real Networks*; page 248, equation 9); and

providing results for network evaluation, design and element feature requirements (i.e., the equations of Baroni represent a heuristic algorithm for evaluating bounds on the number of wavelengths necessary to satisfy a uniform logical connectivity; see the ¶ spanning pages 250 and 251).

With regard to claim **2**, Baroni teaches: The method of claim 1, further comprising:

determining variations of a minimum number of the required network variables using said mathematical expressions (page 245, 2nd column, 2nd full ¶; page 246, 1st column, 2nd ¶).

With regard to claim **3**, Baroni teaches: The method of claim 2, wherein the variance of the number of demands appearing on a link is determined using at least one of the following equations:

$\sigma^2(W°) \leq \langle W° \rangle\ [1 - 1/\langle h \rangle]$;

$\sigma\ (W_{B/E})\ /\ \langle W_{B/E} \rangle \cong \{\ [\langle \delta \rangle_n\ \langle 1/\delta \rangle_n - 1]\ /\ 2\ \}^{½}$;

$\sigma_d(W°)\ /\ \langle W° \rangle = [2/\langle h \rangle][(\sigma(d)/\langle d \rangle]$;

wherein $\langle W° \rangle$ depicts the expectation value of the number of demands carried on the link, $\langle h \rangle$ depicts the expectation value of the number of hops on the link, $\langle \delta \rangle$ depicts the average degree of nodes, and $\langle d \rangle$ depicts the mean number of demands terminating

at a node (i.e., the expectation value of the number of demands carried on a link, is given by equation (9) on page 248. The fact that a path is chosen randomly from among those having the minimum number of hops (page 244, 1st column, 5th full ¶), implies that the probability that any one link is selected is greater than or equal to 1/h. Using these facts and the properties of the binomial distribution, the corresponding variance may be determined (*see* “The Binomial Distribution”, Yale University, 1997, <http://www.stat.yale.edu/Courses/1997-98/101/binom.htm>, page 2)).

With regard to claim **5**, Baroni teaches: The method of claim 1, wherein said network variables are variables selected from the group consisting of network elements, subsystems and components (i.e., the variables in Table 1 are topological features of networks (page 244, 2nd column, 1st ¶ under the heading “V. Results”)).

With regard to claim **6**, Baroni teaches: The method of claim 1, wherein a communication demand model and a network graph, defined by a set of nodes and a set of links, provide inputs for the mathematical expressions (page 243, last ¶ in 1st column, and Figure 1).

With regard to claim **7**, Baroni teaches: The method of claim 1, wherein the mathematical expressions require inputs selected from the group consisting of a number of network nodes, a number of links and a number of demands in said network

(page 248, equation (9); the number of demands at a node is given by N-1 (page 243, 2nd column, 1st ¶)).

With regard to claim **8**, Baroni teaches: The method of claim 1, wherein said mathematical expressions comprise equations for calculating a local value of the number of demands appearing on a link or carried on a means of transmission (i.e., the number of demands on a link is given by equation (9)).

With regard to claim **9**, Baroni teaches: The method of claim 8, wherein the number of demands is determined using the following equation:

$\langle W^\circ \rangle = \langle d \rangle \langle h \rangle / \langle \delta \rangle$;

Wherein $\langle h \rangle$ depicts the expectation value of the number of hops on the link, $\langle \delta \rangle$ depicts the average degree of nodes in the network, and $\langle d \rangle$ depicts the mean number of demands terminating at a node (i.e., substituting equation (4) and the average number of demands at a node = N – 1, into equation (9), gives the equation in this claim).

With regard to claim **10**, Baroni teaches: The method of claim 8, wherein said demands comprise at least one demand selected from the group consisting of uniform demands, random demands, and distance dependent demands (page 243, last ¶ in 1st column).

With regard to claim **11**, Baroni teaches: The method of claim 8, wherein said means of transmission comprises an optical line system or a multi-wavelength optical line system (Abstract).

With regard to claim **14**, Baroni teaches: The method of claim 1, wherein said mathematical expressions comprise equations for calculating a global mean value or a local value of a number of transmission subsystems (page 245, Table 1 and equations (4) and (5); page 248, equation (9)).

With regard to claim **15**, Baroni teaches: The method of claim 1, wherein said mathematical expressions comprise equations for calculating a variance of the number of transmission subsystems (page 245, 2^{nd} column, 2^{nd} full ¶; the calculation of standard deviation implies calculation of variance).

With regard to claim **16**, Baroni teaches: The method of claim 1, wherein said mathematical expressions comprise equations for calculating a global mean value and/or a variance of a number of demands present at a node or connected to a means of bandwidth management (page 245, Table 1 and equations (4) and (5); page 248, equation (9)).

With regard to claim **17**, Baroni teaches: The method of claim 16, wherein said demands comprise at least one demand selected from the group consisting of uniform

demands, random demands, and distance dependent demands (page 243, last ¶ in 1st column).

With regard to claim **18**, Baroni teaches: The method of claim 16, wherein said means of bandwidth management comprises a means selected from the group consisting of an electronic cross- connect, an IP router, a multi-service platform, an optical cross-connect, an optical router, and an optical add/drop multiplexer (page 242, 2nd ¶ under heading “I. Introduction”).

With regard to claim **19**, Baroni teaches: The method of claim 16, wherein said means of bandwidth management comprises a combination of electronic and optical bandwidth management (page 248, last ¶; page 243, 2nd ¶; page 242, 2nd ¶ under heading “I. Introduction”).

With regard to claim **20**, Baroni teaches: The method of claim 1, wherein said mathematical expressions comprise equations for calculating a value of the number of demands present at a node or connected to a means of bandwidth management (i.e., page 243, Figure 1 and 2nd column, 1st ¶; the number of demands present at a node is equal to N – 1).

With regard to claim **22**, Baroni teaches: The method of claim 20, wherein said demands comprise at least one demand selected from the group consisting of uniform

demands, random demands, and distance dependent demands (page 243, last ¶ in 1st column).

With regard to claim **23**, Baroni teaches: The method of claim 20, wherein said means of bandwidth management comprises a means selected from the group consisting of an electronic cross- connect, an IP router, a multi-service platform, an optical cross-connect, an optical router, and an optical add/drop multiplexer (page 242, 2nd ¶ under heading “I. Introduction”).

With regard to claim **24**, Baroni teaches: The method of claim 20, wherein said means of bandwidth management is a combination of electronic and optical bandwidth management (page 248, last ¶; page 243, 2nd ¶; page 242, 2nd ¶ under heading “I. Introduction”).

With regard to claim **25**, Baroni teaches: The method of claim 1, wherein said mathematical expressions comprise equations for calculating a global mean value or a local value of a number of bandwidth management subsystems (page 245, Table 1 and equations (4) and (5); page 248, equation (9)).

With regard to claim **26**, Baroni teaches: The method of claim 1, wherein said mathematical expressions comprise equations for calculating a variance of the number

of bandwidth management subsystems (page 245, 2nd column, 2nd full ¶; the calculation of standard deviation implies calculation of variance).

With regard to claim **27**, Baroni teaches: The method of claim 1, wherein said mathematical expressions comprise equations for calculating a global mean value of the extra capacity necessary for network survivability (i.e., for possible single link failure restoration scenarios, $(\Delta N_\lambda/N_\lambda)_M$ and $(\Delta N_\lambda/N_\lambda)_{av}$ give maximum and average increments in the wavelength requirement (in %) (page 250, 1st column, Table III and 2nd ¶)).

With regard to claim **29**, Baroni teaches: The method of claim 1, wherein said mathematical expressions comprise equations for calculating a local value of the extra capacity required on a link or means of transmission for network survivability (i.e., in the case of uniform traffic demand (page 243, 1st column, last ¶), the local value of the extra capacity required on a link or means of transmission for network survivability, is equivalent to the global mean value of the extra capacity necessary for network survivability (page 250, 1st column, Table III and 2nd ¶).).

With regard to claim **30**, Baroni teaches: The method of claim 1, wherein said mathematical expressions comprise equations for calculating a cost of transmission of demands across the network (i.e., on page 249, in Figure 11, the solid line represents a savings of wavelengths versus a percentage of links added, which line corresponds to an equation for calculating a cost of transmission of demands across the network.

Reductions in the number of wavelengths may be achieved at the cost of more fiber added (page 249, the ¶ that spans the columns, and the 2nd ¶ in the 2nd column).).

With regard to claim **31**, Baroni teaches: The method of claim 1, wherein said mathematical expressions comprise equations for calculating a cost of bandwidth management of demands across the network (i.e., the solid line in Figure 11 represents savings of wavelengths versus percentage of links added, which line corresponds to an equation for calculating a cost of bandwidth management of demands across the network. Reductions in the number of wavelengths may be achieved at the cost of more fiber added (page 249, the ¶ that spans the columns, and the 2nd ¶ in the 2nd column).).

With regard to claim **32**, Baroni teaches: The method of claim 1, wherein said mathematical expressions comprise equations for calculating a ratio of cost of electronic and optical bandwidth management (i.e., equations for calculating average nodal degree (page 245, equation (4)), and for calculating increment in wavelength requirement for restoration (page 250, 1st column, Table III and 2nd ¶), may further be for calculating a ratio of cost of electronic and optical bandwidth management).

With regard to claim **33**, Baroni teaches: The method of claim 1, wherein said mathematical expressions comprise equations for calculating a ratio of cost of transmission and bandwidth management (i.e., equations for calculating average nodal

degree (page 245, equation (4)), and for calculating increment in wavelength requirement for restoration (page 250, 1st column, Table III and 2nd ¶), may further be for calculating a ratio of cost of transmission and bandwidth management).

With regard to claim **34**, Baroni teaches: The method of claim 1, wherein said mathematical expressions comprise equations for calculating a cost of the network (i.e., equations for calculating average nodal degree (page 245, equation (4)), and for calculating increment in wavelength requirement for restoration (page 250, 1st column, Table III and 2nd ¶), and for calculating the number of demands on a link (page 248, 1st column, equation (9)), may further be for calculating a cost of the network).

With regard to claim **35**, Baroni teaches: The method of claim 1, wherein said network comprises a network selected from the group consisting of a two-dimensional-single-tier mesh network, a two-dimensional-multi-tier network, a multi-dimensional network, and a multi-dimensional-multi-tier network (page 243, Figure 1; page 245, Table I).

Claim Rejections - 35 USC § 103

13. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

14. Claims **4, 12, 13 and 21** are rejected under 35 U.S.C. 103(a) as being unpatentable over Baroni in view of **Al-Salameh et al.** ("Optical Switching in Transport Networks: Applications, Requirements, Architectures, Technologies, and Solutions", in *Optical Fiber Telecommunications IV A Components* (Kaminow, I. P., et al., Eds.), Academic Press, 2002, pp. 295–373) (or "Al-Salameh").

With regard to claim **4**, Baroni teaches: The method of claim 2 (see discussion above). Baroni does not teach, but Al-Salameh does teach: wherein the variance of the ratio of terminated to through traffic is determined using the following equation:

$\langle \rho' \rangle = 2/[1 + \langle h \rangle]$;

wherein $\langle h \rangle$ depicts the expectation value of a number of hops on the network (i.e., for a uniform network, the number of add/drop ports at each node is 2*A = 2*(N – 1) (page 304, Figure 1.7; page 303, last ¶). The number of input (output) ports required on the typical cross-connect is $\langle M \rangle = (N - 1)(1 + \langle h \rangle)$; (page 304, last ¶ and equation (1.1)). The ratio of terminated to through traffic $\langle \rho' \rangle = 2*A/\langle M \rangle = 2/[1 + \langle h \rangle]$, *in order to size the transport capacity to the demand* (page 301, 1st ¶)). Based on Baroni in view of Al-Salameh, it would have been obvious to a person having ordinary skill in the art at the time the Applicant's invention was made, to combine the teaching of Al-Salameh with the claimed subject matter as taught by Baroni, in order to size the transport capacity to the demand.

With regard to claim **12**, Baroni teaches: The method of claim 1 (see discussion above). Baroni does not teach, but Al-Salameh does teach: wherein said mathematical expressions comprise equations for calculating a mean number of hops (page 305, 1st ¶), *in order to size the transport capacity to the demand* (page 301, 1st ¶)). Based on Baroni in view of Al-Salameh, it would have been obvious to a person having ordinary skill in the art at the time the Applicant's invention was made, to combine the teaching of Al-Salameh with the claimed subject matter as taught by Baroni, in order to size the transport capacity to the demand.

With regard to claim **13**, Baroni in view of Al-Salameh teaches: The method of claim 12 (see discussion above). Al-Salameh further teaches: wherein said mean number of hops is determined using the following equation:

$\langle h \rangle = \{ (N-2)/(\langle \delta \rangle -1) \}^{1/2}$;

wherein N depicts a number of nodes in the network, and $\langle \delta \rangle$ depicts the average degree of the nodes (i.e., the average number of hops of a network may be estimated to within 10% accuracy using $\langle h \rangle = \{ (N-1)/\langle \delta \rangle \}^{1/2}$ (page 305, 1st ¶)). Here, the claimed values and prior art values do not overlap but are close enough that one skilled in the art would have expected them to have the same properties. *Titanium Metals Corp. of America v. Banner*, 778 F.2d 775, 227 USPQ 773 (Fed. Cir. 1985); see MPEP § 2144.05. Therefore, the limitations of claim 13 are rejected in the analysis of claim 12, and the claim is rejected on that basis.

With regard to claim **21**, Baroni teaches: The method of claim 20 (see discussion above). Baroni further teaches: wherein the number of demands present at a node is determined using the following equation:

$\langle P_1 \rangle = \langle d \rangle + \langle W^0 \rangle \langle \delta \rangle$;

wherein $\langle W^0 \rangle$ depicts the expectation value of the number of demands carried on a link, $\langle \delta \rangle$ depicts the average degree of nodes in the network, and $\langle d \rangle$ depicts the mean number of demands terminating at a node (i.e., the average number of demands at a node = (N – 1) (page 243, 2nd column, 1st ¶). Substituting equation (4) and $(N-1) = \langle d \rangle$ into equation (9) gives average demands on a link = $\langle d \rangle \langle h \rangle / \langle \delta \rangle = \langle W° \rangle$. The average number of input (output) ports required on the typical cross-connect $\langle P_1 \rangle = (N-1)(1 + \langle h \rangle) = \langle d \rangle (1 + \langle h \rangle) = \langle d \rangle + \langle d \rangle \langle h \rangle = \langle d \rangle + \langle W° \rangle \langle \delta \rangle$ (page 304, last ¶ and equation (1.1)).).

Baroni does not teach, but Al-Salameh does teach:

$\langle P^{\kappa} \rangle$, $(1 + \langle \kappa \rangle)$;

wherein $\langle \kappa \rangle$ depicts the extra capacity for restoration (i.e., if a 50% overbuild for shared restoration is assumed, the average number of input number ports occupied on a cross-connect $\langle P^{\kappa} \rangle = \langle M \rangle = (N-1)(1 + \frac{3}{2}\langle h \rangle)$, in which the overbuild factor $(1 + \langle \kappa \rangle) = \frac{3}{2}$ = (1 + 0.5), *for the purpose of network survivability* (page 305, 2nd ¶ and equation (1.2)).). Based on Baroni in view of Al-Salameh, it would have been obvious to a person having ordinary skill in the art at the time the Applicant's invention was made, to combine the teaching of Al-Salameh with the claimed subject matter as taught by Baroni, for the purpose of network survivability.

15. Claim **28** is rejected under 35 U.S.C. 103(a) as being unpatentable over Baroni in view of **Weis** (US Pub. No. 20030067867).

With regard to claim **28**, Baroni teaches: The method of claim 27 (see discussion above). Baroni does not teach, but Weis does teach: wherein the global mean value of extra capacity is determined using at least one of the following equations:

$\langle\kappa\rangle \cong 2/\langle\delta\rangle$;

$\langle\kappa\rangle \cong 4\langle h\rangle/L$;

wherein $\langle\delta\rangle$ depicts the average degree of nodes in the network and $\langle h\rangle$ depicts the mean number of hops and L depicts the number of links (i.e., where p is the percentage of overhead capacity for a network needed in addition *to make it restorable*, and d is the average node degree of the network, the relation holds that p*d=2 (Figure 6; [0050]). Solving this relation for p gives p = 2/d = $\langle\kappa\rangle$ = 2/$\langle\delta\rangle$.). Based on Baroni in view of Weis, it would have been obvious to a person having ordinary skill in the art at the time the Applicant's invention was made, to combine the teaching of Weis with the claimed subject matter as taught by Baroni, in order to make the network restorable.

16. Claims **36-38** are rejected under 35 U.S.C. 103(a) as being unpatentable over Baroni in view of **Kirby et al.** (US Pub. No. 20020120768) (or "Kirby").

With regard to claim **36**, Baroni teaches: a method comprising:

determining quantities of required network variables using closed-form mathematical expressions for network-wide expectation values for mean quantities of

the required network variables (page 245, Table I and equations 4 and 5; page 244, 1st ¶ under "*A. Real Networks*; page 248, equation 9); and

providing results for network evaluation, design and element feature requirements (i.e., the equations of Baroni represent a heuristic algorithm for evaluating bounds on the number of wavelengths necessary to satisfy a uniform logical connectivity; see the ¶ spanning pages 250 and 251).

Baroni does not teach, but Kirby does teach: A computer-readable medium for storing a set of instructions, which when executed by a processor, perform a method ([0009], [0023]). Based on Baroni in view of Kirby, it would have been obvious to a person having ordinary skill in the art at the time the Applicant's invention was made, to combine the teaching of Kirby with the claimed subject matter as taught by Baroni, in order to use a network admission controller to process mean and standard deviation measurements of aggregated flows across a network (Kirby at [0023]).

With regard to claim **37**, Baroni in view of Kirby teaches: The computer readable medium of claim 36 (see discussion above). Baroni further teaches: wherein said method further comprises:

determining variations of a minimum number of required network variables using said mathematical expressions (page 245, 2nd column, 2nd full ¶; page 246, 1st column, 2nd ¶).

Therefore, the limitations of claim 37 are rejected in the analysis of claim 36, and the claim is rejected on that basis.

With regard to claim **38**, Baroni teaches: quantifying the needs and costs of a network (i.e., Baroni evaluates bounds on the number of wavelengths necessary to satisfy a uniform logical connectivity; see the ¶ spanning pages 250 and 251); and performing the step of:

determining quantities of required network variables using closed-form mathematical expressions for network-wide expectation values for mean quantities of the required network variables (page 245, Table I and equations 4 and 5; page 244, 1st ¶ under "*A. Real Networks*; page 248, equation 9); and

providing results for network evaluation, design and element feature requirements (i.e., the equations of Baroni represent a heuristic algorithm for evaluating bounds on the number of wavelengths necessary to satisfy a uniform logical connectivity; see the ¶ spanning pages 250 and 251).

<u>Baroni does not teach, but Kirby does teach</u>: A computer program product stored on a computer-readable medium loadable into a computer for quantifying the needs and costs of a network, the computer program product comprising software for performing the step ([0009], [0023]). <u>Based on Baroni in view of Kirby</u>, it would have been obvious to a person having ordinary skill in the art at the time the Applicant's invention was made, to combine the teaching of Kirby with the claimed subject matter as taught by Baroni, in order to use a network admission controller to process mean and standard deviation measurements of aggregated flows across a network (Kirby at [0023]).

Conclusion

17. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

18. Any inquiry concerning this communication or earlier communications from the examiner should be directed to John Isom whose telephone number is (571)270-7203. The examiner can normally be reached on Monday through Friday, 9:30 a.m. to 6:00 p.m. ET.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, James Hwang can be reached on (571)272-4036. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/J. I./
Examiner, Art Unit 2447
11/19/2009

/Joon H. Hwang/
Supervisory Patent Examiner, Art Unit 2447